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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,247	05/31/2006	Koji Nakayama	925-342	1791
23117 7590 09/03/2008 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
GREEN, TELY D				
ART UNIT		PAPER NUMBER		
2822				
MAIL DATE		DELIVERY MODE		
09/03/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/581,247

**Applicant(s)**

NAKAYAMA ET AL.

**Examiner**

TELLY D. GREEN

**Art Unit**

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-15 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) 16, 17 and 21-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-15 and 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 5/31/06 and 1/8/07.
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of Species 1, Embodiment I, claims 13-15 and 18-20 in the reply filed on May 30, 2008 is acknowledged. Claims 16, 17, and 21-24 have been withdrawn.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **13-15 and 18-20** are rejected under 35 U.S.C. 102(b) as being anticipated by Shiomi et al. (Shiomi) (**EP 1,215,730 A1**).

In regards to claim 13, Shiomi discloses (**Fig. 6, page 9, paragraph 82 to page 10, paragraph 92**) a substrate (**item 2**) in which a surface having a specified off-angle from a (000-1) carbon surface of a crystal of a first-conductive-type silicon carbide semiconductor whose base material is silicon carbide, which is a compound of carbon and silicon is formed; and at least one drift layer (**item 6**) which is formed on a crystal growth surface of the substrate at a specified formation rate with a first- or second-conductive-type silicon carbide semiconductor, where the surface of the substrate having the specified off- angle is taken as the crystal growth surface of the substrate (**Fig. 6, page 9, paragraph 82 to page 10, paragraph 92**) a substrate (**item 2**).

**In regards to claim 14**, Shiomi discloses including at least one layer (**items 4, 16**) of a first- or second-conductive-type silicon carbide semiconductor formed on the drift layer (**item 6**) (**Fig. 6, page 9, paragraph 82 to page 10, paragraph 92**).

**In regards to claim 15**, Shiomi discloses (**Fig. 6, page 9, paragraph 82 to page 10, paragraph 92**) wherein the substrate serves as a cathode (**items 14, 2**) and the bipolar semiconductor device further includes a semiconductor layer (**items 16, 12**) which is formed on the drift layer and which is of a second-conductive-type silicon carbide to serve as an anode.

**In regards to claim 18**, Shiomi discloses wherein the off-angle is within a range of 2 to 10 degrees (**Fig. 6, page 9, paragraph 82**).

**In regards to claim 19**, Shiomi discloses (**Fig. 6, page 9, paragraph 82 to page 10, paragraph 92**) wherein the film that is to serve as a drift layer (**item 6**) and that is formed by epitaxial growth of silicon carbide is formed at a film growth rate having a film-thickness increasing rate per hour h of 10 pm/h or more.

The applicant has not established the critical nature of having a film-thickness increasing rate per hour h of 10 pm/h or more. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). However, these limitations are product-by-process limitations.

**"Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The**

**patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process."** In re Thorpe, 777 F. 2d 695, 698, 227 USPQ 964, 966 (fed Cir. 1985).

**In regards to claim 20**, Shiomi discloses (**Fig. 6**) including a buffer layer (**item 4**) formed between the substrate (**item 2**) and the drift layer (**item 6**).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited for disclosing related limitations of the applicant's claimed and disclosed invention.

### **Shiomi et al. US Patent 6,734,461 B1**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TELLY D. GREEN whose telephone number is (571)270-3204. The examiner can normally be reached on Monday thru Friday 7:30 AM - 5:00 PM EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Telly D Green/  
Examiner, Art Unit 2822  
August 27, 2008

/Kiesha L. Rose/  
Primary Examiner, Art Unit 2822